



1966 OPERATING SUMMARY

# BURLINGTON

(Drury Lane)

*water pollution  
control plant*

TD  
367  
.A56  
B874  
1966  
MOE

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

**TD**  
**367** Burlington Drury Lane : water  
pollution control plant.

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**B874**

**1966**



ONTARIO WATER RESOURCES COMMISSION  
OFFICE OF THE GENERAL MANAGER

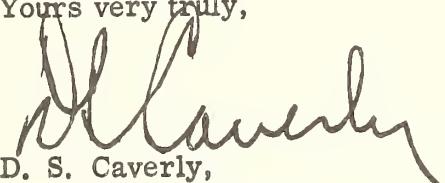
Members of the Burlington Drury Lane Local Advisory Committee,  
Town of Burlington.

Gentlemen:

We are pleased to submit to you the 1966 Operating Summary for the Burlington Drury Lane Water Pollution Control Plant, OWRC Project No. 60-S-51.

It is hoped that our joint participation in efforts to combat water pollution will have even more success in the coming year.

Yours very truly,

  
D. S. Caverly,  
General Manager.

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ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

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D. S. CAVERLY  
GENERAL MANAGER

W. S. MACDONNELL  
COMMISSION SECRETARY

General Manager,  
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Burlington Drury Lane Water Pollution Control Plant, OWRC Project No. 60-S-51.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

B. C. Palmer, P. Eng.,  
Director,  
Division of Plant Operations.



## FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

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BURLINGTON  
Drury Lane  
water pollution control plant

operated for  
THE TOWN OF BURLINGTON  
by the  
ONTARIO WATER RESOURCES COMMISSION

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Assistant Director: C. W. Perry  
Regional Supervisor: D. A. McTavish  
Operations Engineer: B. W. Hansler

801 Bay Street      Toronto 5



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## **'66 REVIEW**

Burlington Drury Lane Water Pollution Control Plant treated a total of 578.418 million gallons of sewage during the year at a total operating cost of \$38,565.75. The operating cost per million gallons and the cost per pound of BOD removed were \$66.67 and \$0.03 respectively.

The average daily flow during the year was 1.59 million gallons. The plant design flow of 2.5 million gallons was exceeded 2.5 percent of the time. The abandoned forcemain from pumping station number nine connected to the East End Trunk Sanitary sewer and the plant intake works is used as an automatic by-pass to the Skyway plant when the flow exceeds approximately three million gallons per day.

The average raw sewage BOD and suspended solids concentrations were 238 ppm and 310 ppm respectively. The average effluent BOD and suspended solids concentrations were 14 ppm and 9 ppm respectively. The average BOD and suspended solids reduction efficiencies were 94 percent and 97 percent respectively.

## PROJECT COSTS

NET CAPITAL COST (Final)	\$676,033.78
DEDUCT - Payments from Municipalities	<u>41,721.91</u>
Long Term Debt to OWRC	<u>\$634,311.87</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	<u>\$149,347.27</u>
Net Operating	\$ 38,565.75
Debt Retirement	23,013.00
Reserve	3,753.63
Interest Charged	35,687.83
TOTAL	<u>\$101,020.21</u>

## RESERVE ACCOUNT

Balance at January 1, 1966	\$ 23,590.49
Deposited by Municipality	3,753.63
Interest Earned	<u>1,387.54</u>
Less Expenditures	-
Balance at December 31, 1966	<u>\$ 28,731.66</u>

# MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDAY	WATER
JAN	1715.18	1117.69			573.71			7.18	5.70	10.90	
FEB	2637.60	1092.78			587.37	224.03	44.17			689.25	
MARCH	2535.85	1107.22		48.02	612.98		15.26	28.58	155.88	541.51	26.40
APRIL	3835.26	1950.61			619.34	672.09	62.76		107.65	422.81	
MAY	2820.93	1190.91			563.63		97.45		456.35	484.48	28.11
JUNE	4455.90	1253.76			671.70	456.76	81.80		102.00	1889.88	
JULY	3360.08	1181.67	320.49	79.88	670.87	228.38	40.20		183.93	628.21	26.40
AUG	3164.21	1327.45	281.30		641.71	228.38	27.60	60.58	136.40	460.79	
SEPT	3304.50	1847.17	252.03	69.91	510.92		66.46			534.80	23.21
OCT	2485.49	1323.53	96.52			228.38	88.20		212.31	536.55	
NOV	3522.72	1253.88			698.99	402.90	231.81		351.73	560.69	22.72
DEC	4728.03	1314.03	205.43	69.46	1128.31	456.76	150.53		415.19	968.16	20.16
<b>TOTAL</b>	<b>38565.75</b>	<b>15960.70</b>	<b>1155.77</b>	<b>267.27</b>	<b>7279.53</b>	<b>2897.68</b>	<b>906.24</b>	<b>96.34</b>	<b>2127.19</b>	<b>7728.03</b>	<b>147.00</b>

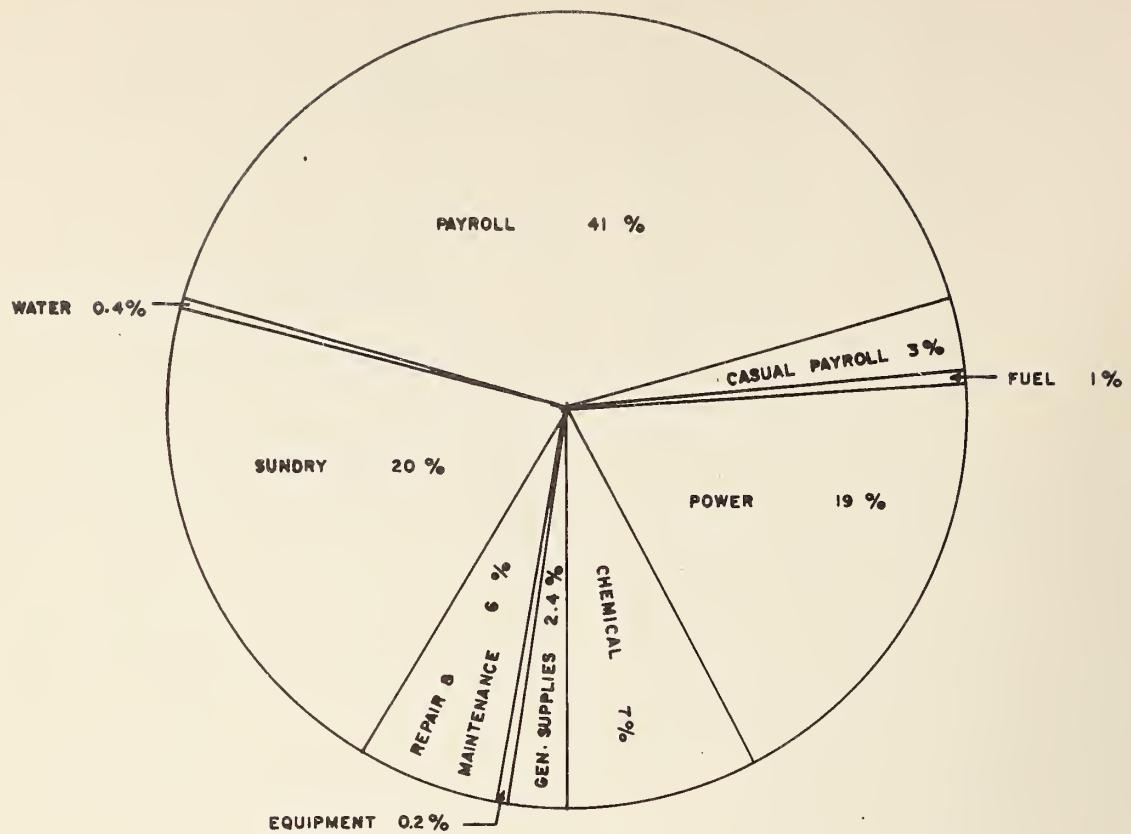
\* SUNDAY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$5,793.67

# YEARLY OPERATING COSTS

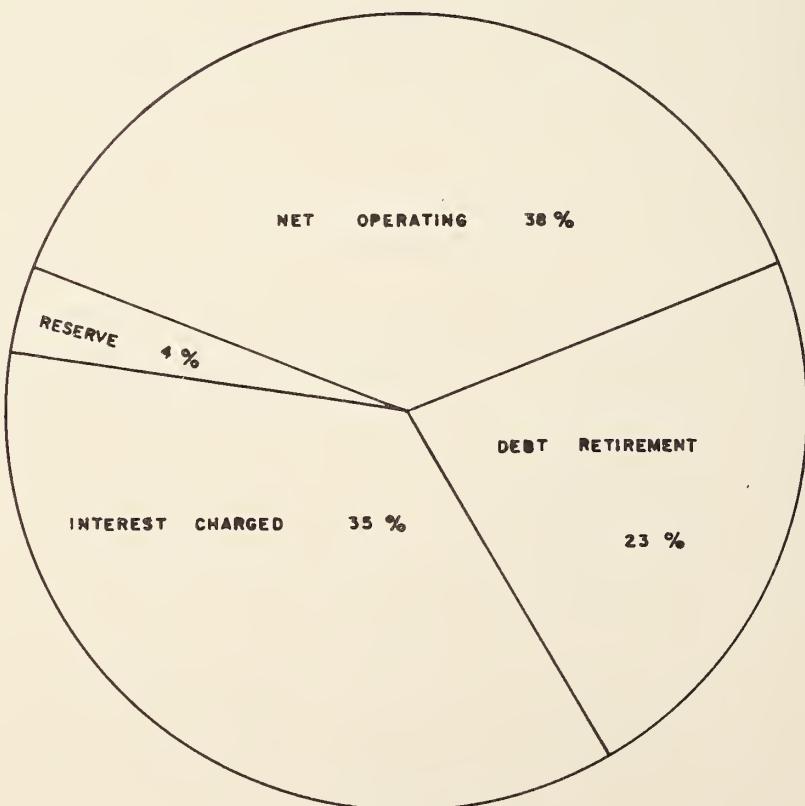
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1961	734.00	\$38,823.00	*	\$ 52.20	-
1962	891.90	\$41,983.00	-	\$ 47.00	3 CENTS
1963	842.28	\$43,454.00	-	\$ 51.60	3 CENTS
1964	823.80	\$45,026.00	\$7.78	\$ 54.65	2 CENTS
1965	606.72	\$37,586.43	\$7.92	\$ 61.95	3 CENTS
1966	578.418	\$38,565.75	\$8.15	\$ 66.67	3 CENTS

\* BASED ON 3.9 PERSONS PER FAMILY AND TOTAL COST OF BURLINGTON PLANTS.

# 1966 OPERATING COSTS



# TOTAL ANNUAL COST



## **Process Data**

Average daily flows are plotted on a probability basis and on an average per month basis on the accompanying graphs.

The average daily flow during the year was 1.59 million gallons. The maximum and minimum average daily flows averaged per month occurred in March and November and were 2.73 million gallons and 1.17 million gallons respectively. The plant design flow of 2.5 million gallons was exceeded 2.5 percent of the time.

The decrease in flow which occurred in 1966 can be attributed to the fact that some of the flow which previously would have reached the plant was diverted to the Skyway plant during the year.

AVERAGE DAILY FLOW  
GRAPH No. 1

5.0

4.5

4.0

3.5

3.0

DESIGN

1.0 0.5 0

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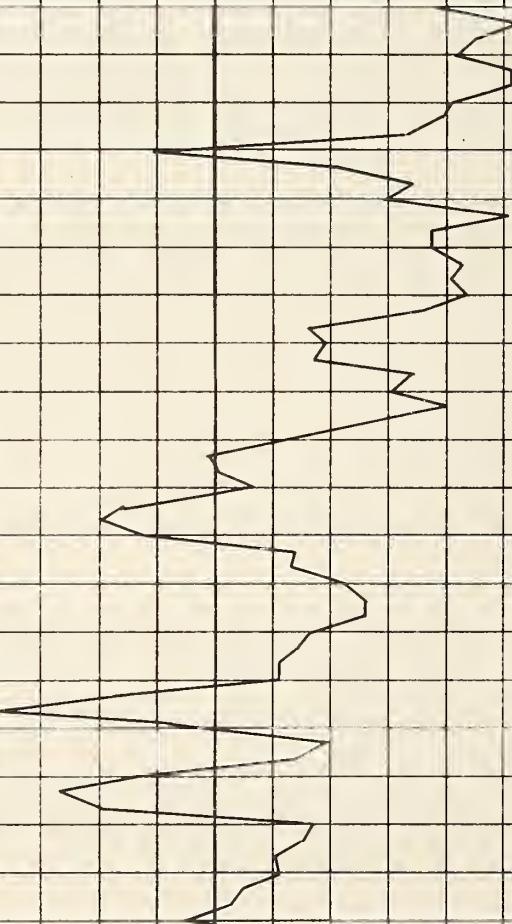
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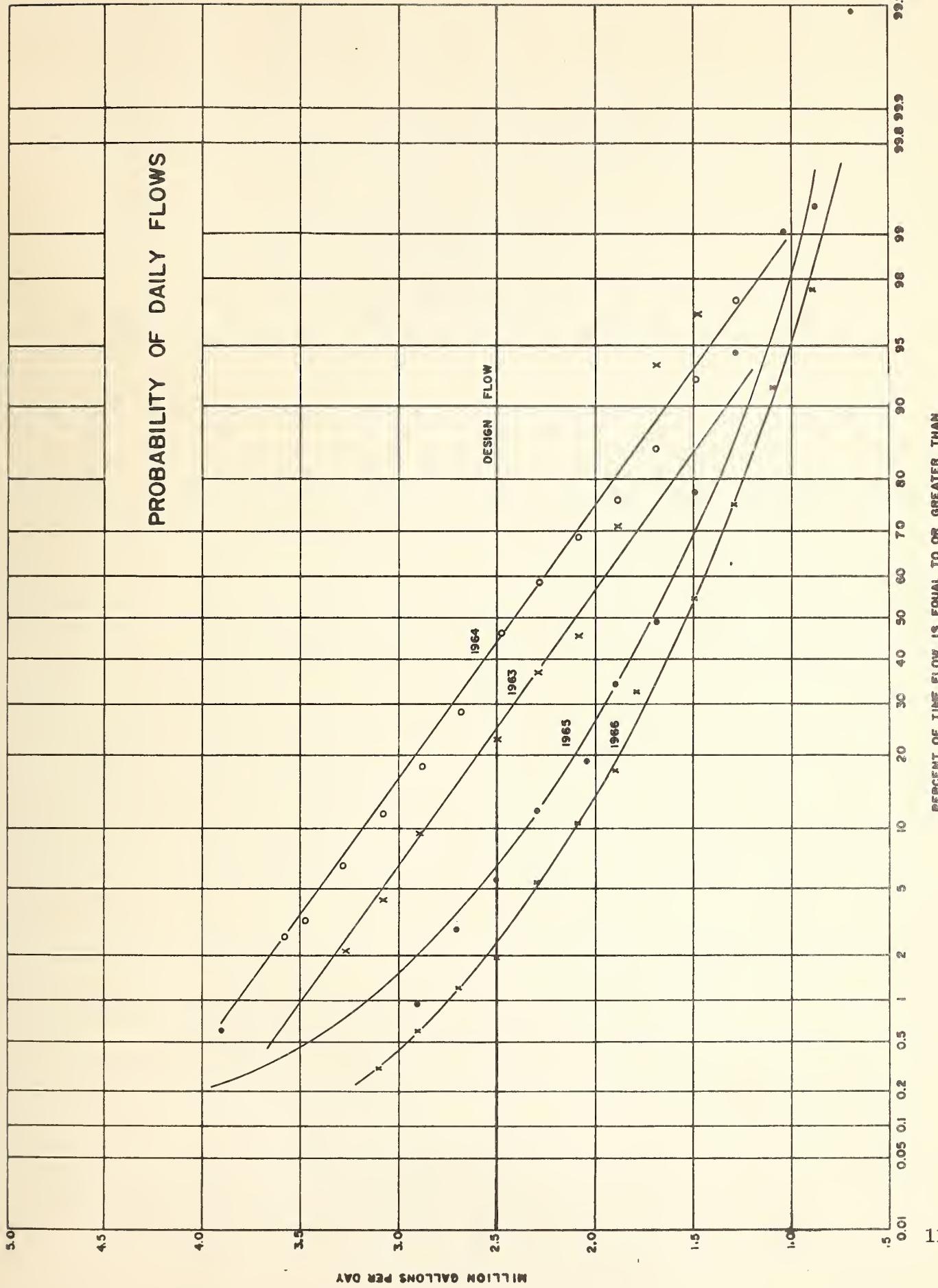
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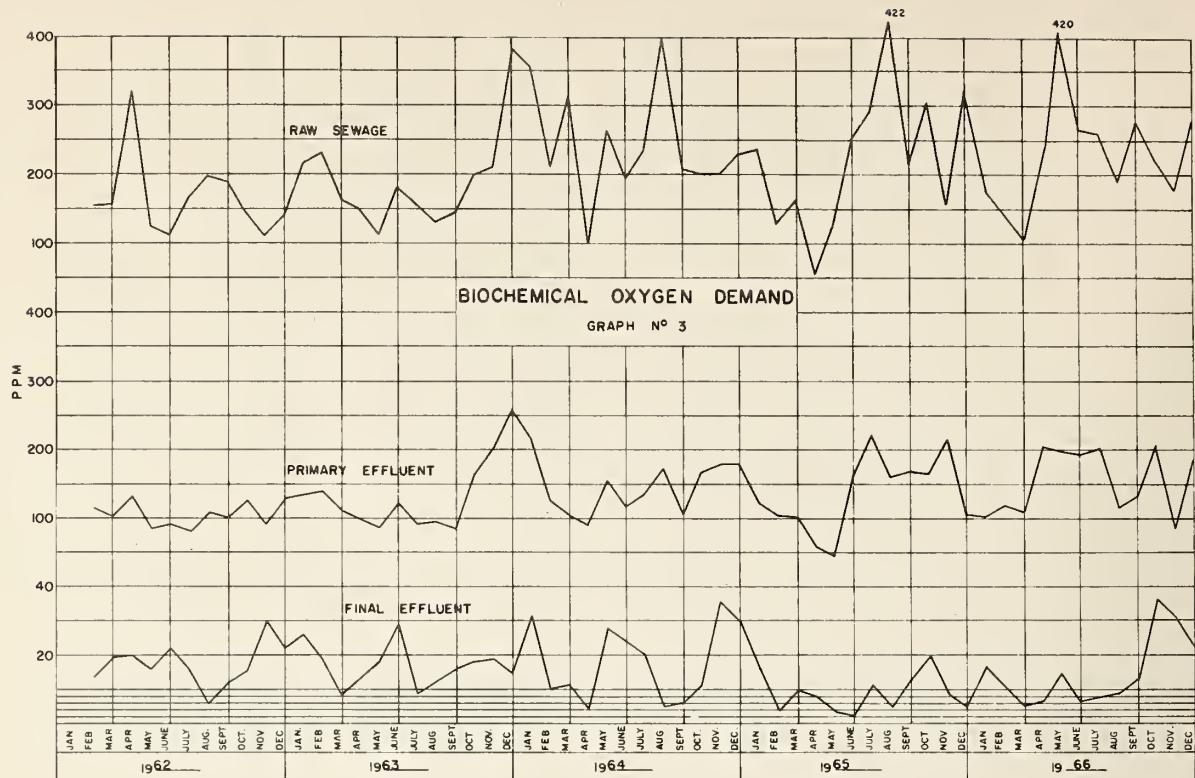
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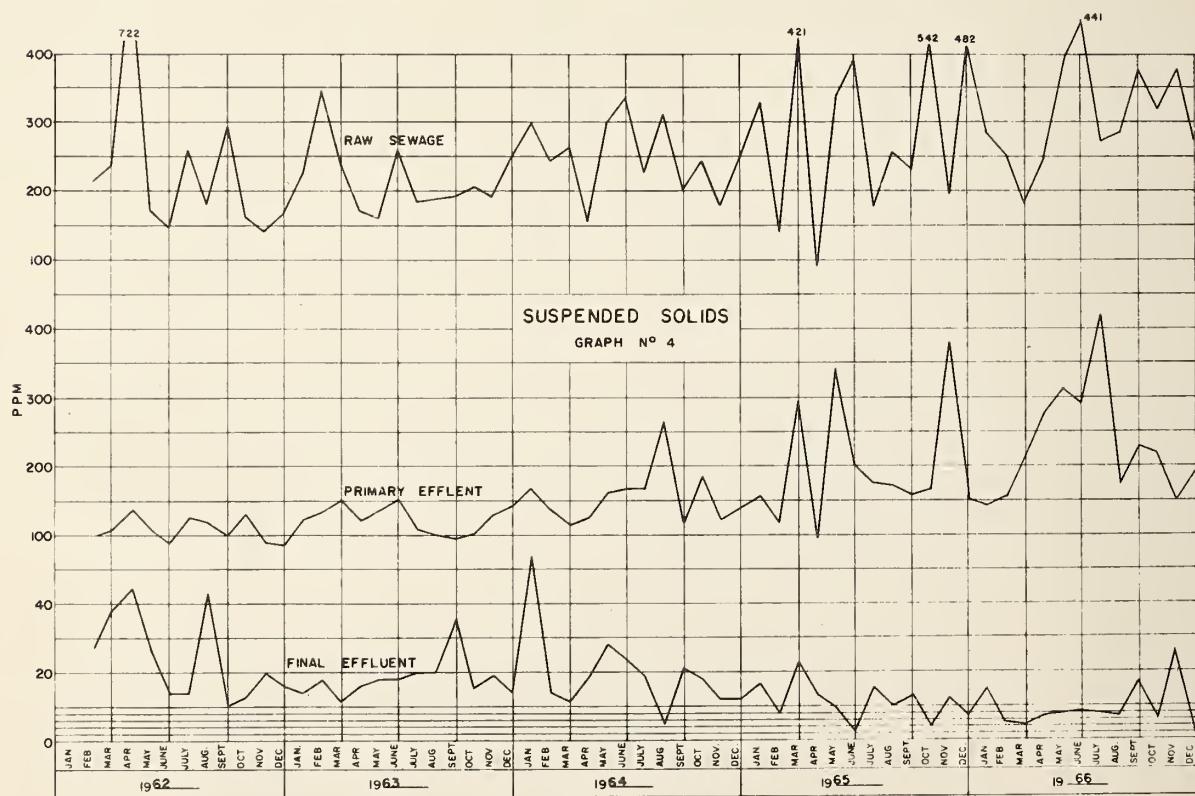
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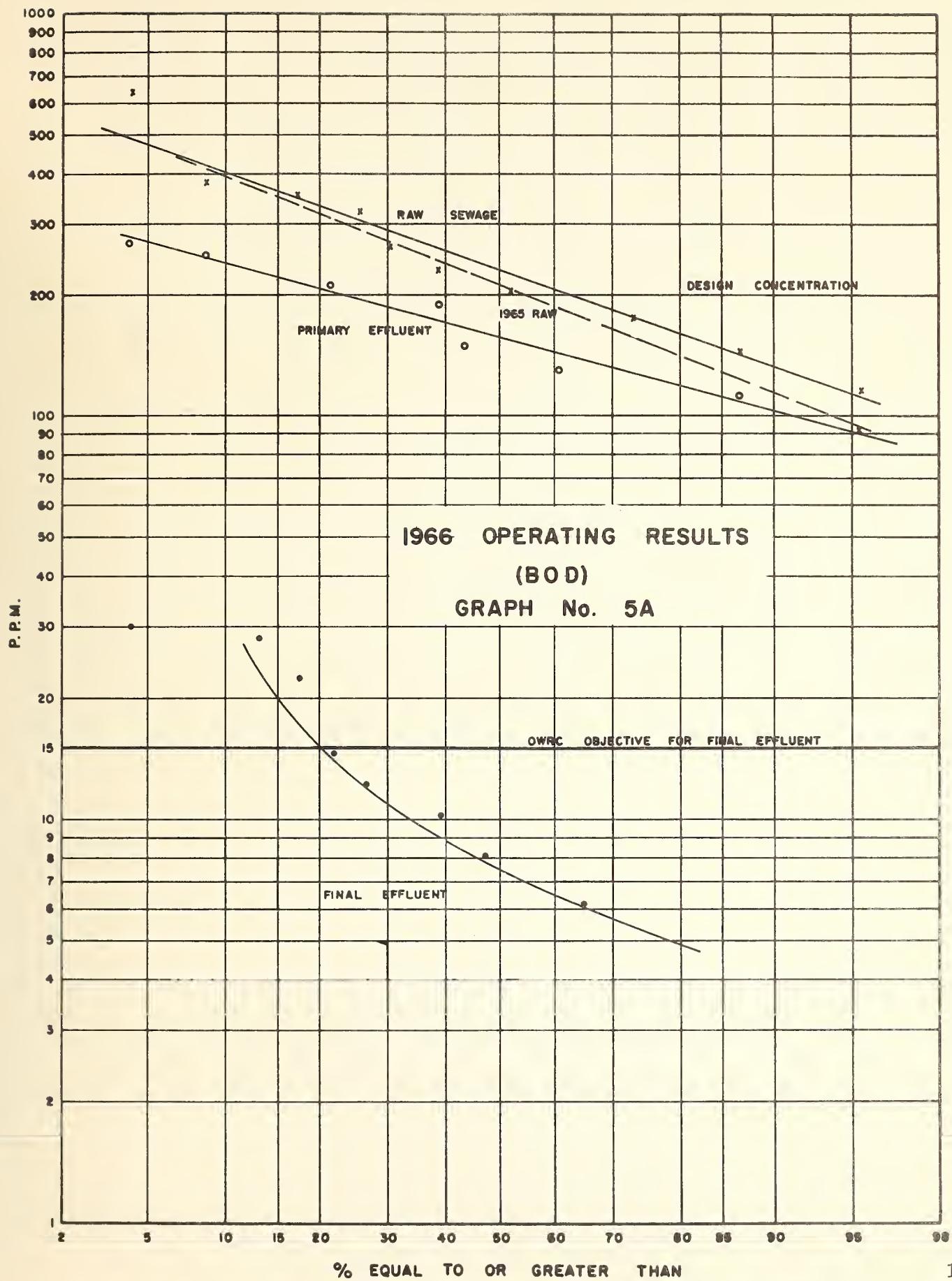


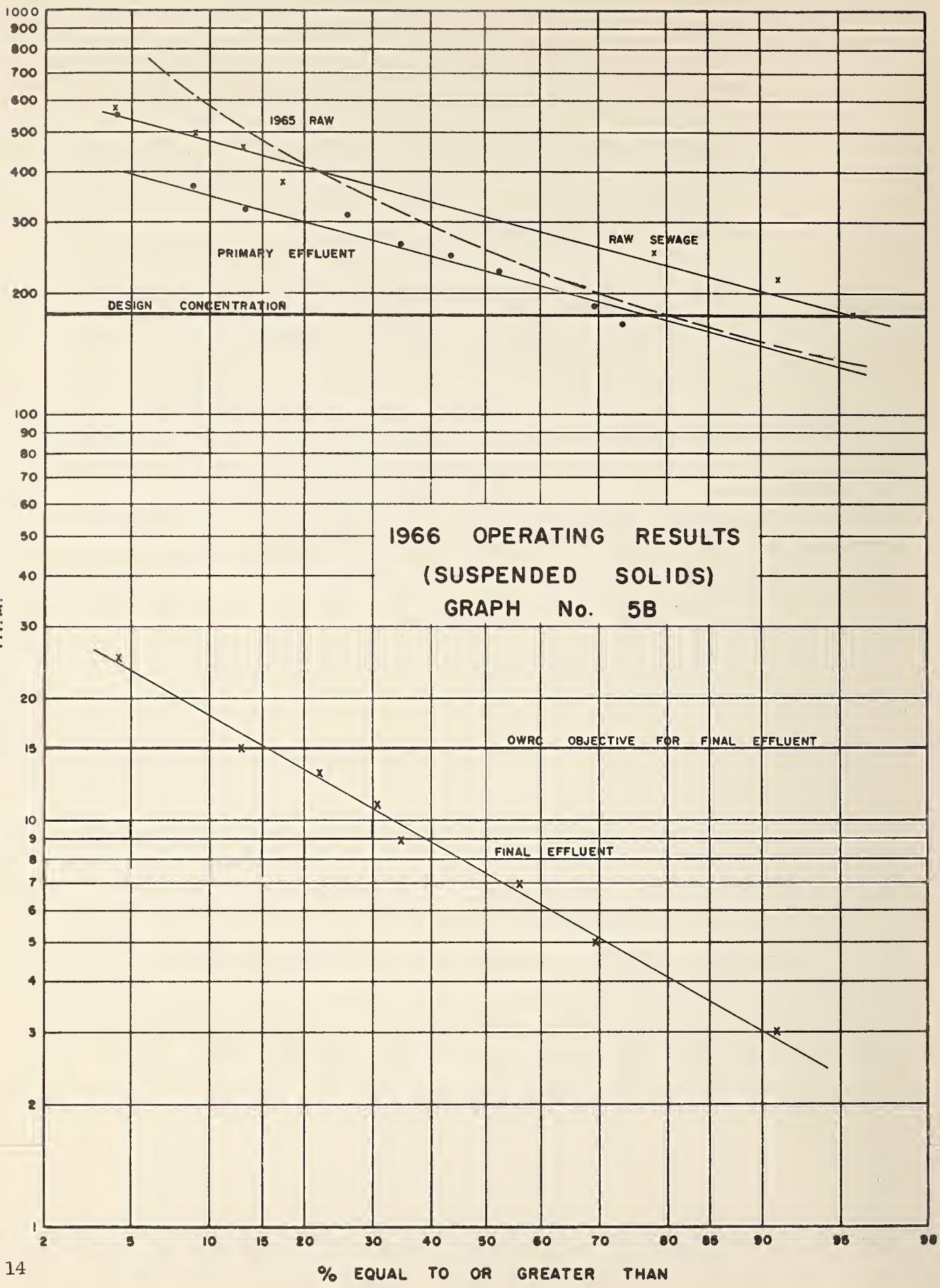




## MONTHLY VARIATIONS







# **GRIT, B.O.D AND S.S. REMOVAL**

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	275	16	94.0	66.2	285	15	94.5	69.0	17
FEB.	145	10	93.0	37.0	256	5	98.0	68.8	5
MAR.	109	4.3	96.0	44.2	179	4	97.5	74.0	11
APR.	220	5.6	97.5	53.6	248	6.5	97.5	60.4	17
MAY	430	14	96.5	98.4	392	7	98.0	91.1	14
JUNE	265	6	97.5	57.7	441	8	98.0	96.5	19
JULY	262	7	97.5	47.9	268	8	97.0	48.8	27
AUG.	182	8	95.5	32.7	281	8	97.0	51.4	10
SEPT.	280	12	95.5	59.4	387	17	95.5	81.9	42
OCT.	220	36	83.5	38.6	318	6	98.0	65.4	34
NOV.	179	30	83.0	26.4	384	25	93.5	42.2	12
DEC.	292	22	92.5	66.2	278	3	99.0	67.5	55
<b>TOTAL</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>647.8</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>870.5</b>	<b>263</b>
<b>AVG.</b>	<b>238</b>	<b>14</b>	<b>94.0</b>	<b>54.0</b>	<b>310</b>	<b>9</b>	<b>97.0</b>	<b>72.5</b>	<b>22</b>

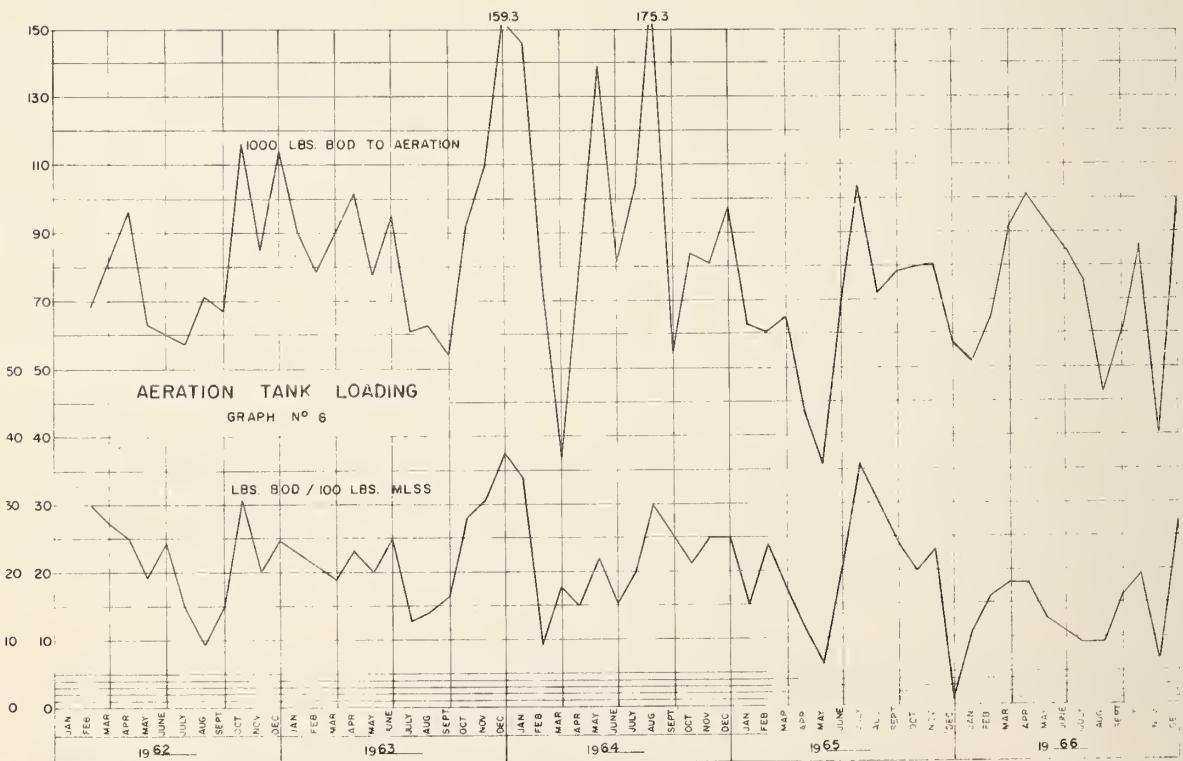
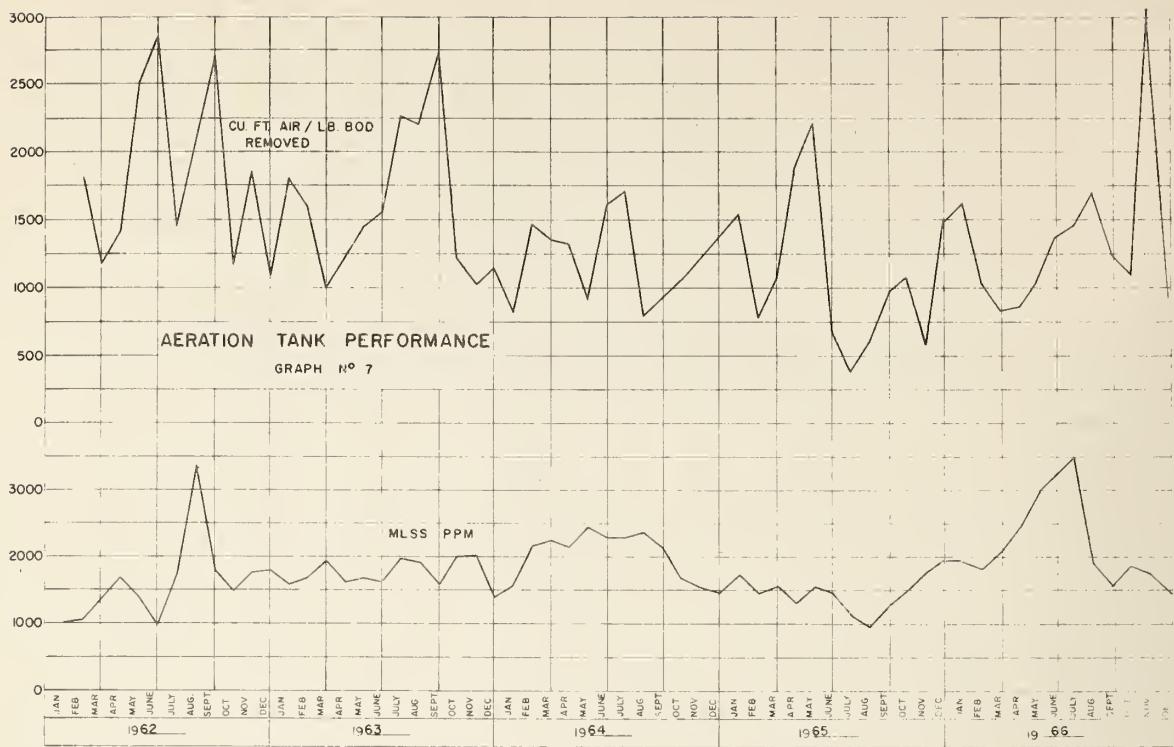
## **COMMENTS**

Average BOD and suspended solids concentrations plotted on a probability basis and on an average per month basis are included on accompanying graphs.

The average raw sewage BOD and suspended solids concentrations were 238 ppm and 310 ppm respectively. The design BOD and suspended solids concentration were exceeded 64 percent and 96 percent of the time respectively. Excellent treatment was afforded by the plant reducing the BOD and suspended solids to average concentrations of 14 ppm and 9 ppm respectively. The average BOD and suspended solids reductions efficiencies were 94.0 percent and 97.0 percent respectively.

The effluent BOD and suspended solids concentrations exceeded the OWRC objectives 20 percent and 16 percent of the time respectively.

During the year a total of approximately 263 cubic feet of grit were removed, averaging 0.46 cubic feet per million gallons, which is lower than anticipated.



## AERATION SECTION

MONTH	PRIM. EFFL B.O.D. P.P.M.	MLSS. P.P.M.	LBS. BOD. PER 100 LBS. M.L.S.S.	CUBIC FEET AIR PER LB. BOD. REMOVED
JANUARY	102	1920	11	1615
FEBRUARY	120	1806	16	1027
MARCH	108	2079	18	845
APRIL	202	2409	18	862
MAY	197	2916	13	1052
JUNE	194	3236	11	1391
JULY	200	3483	9	1470
AUGUST	116	1847	9	1699
SEPTEMBER	135	1556	16	1246
OCTOBER	205	1846	19	1101
NOVEMBER	86	1731	7	3805
DECEMBER	197	1481	27	918
TOTAL	-	-	-	-
AVERAGE	155	2192	14	1419

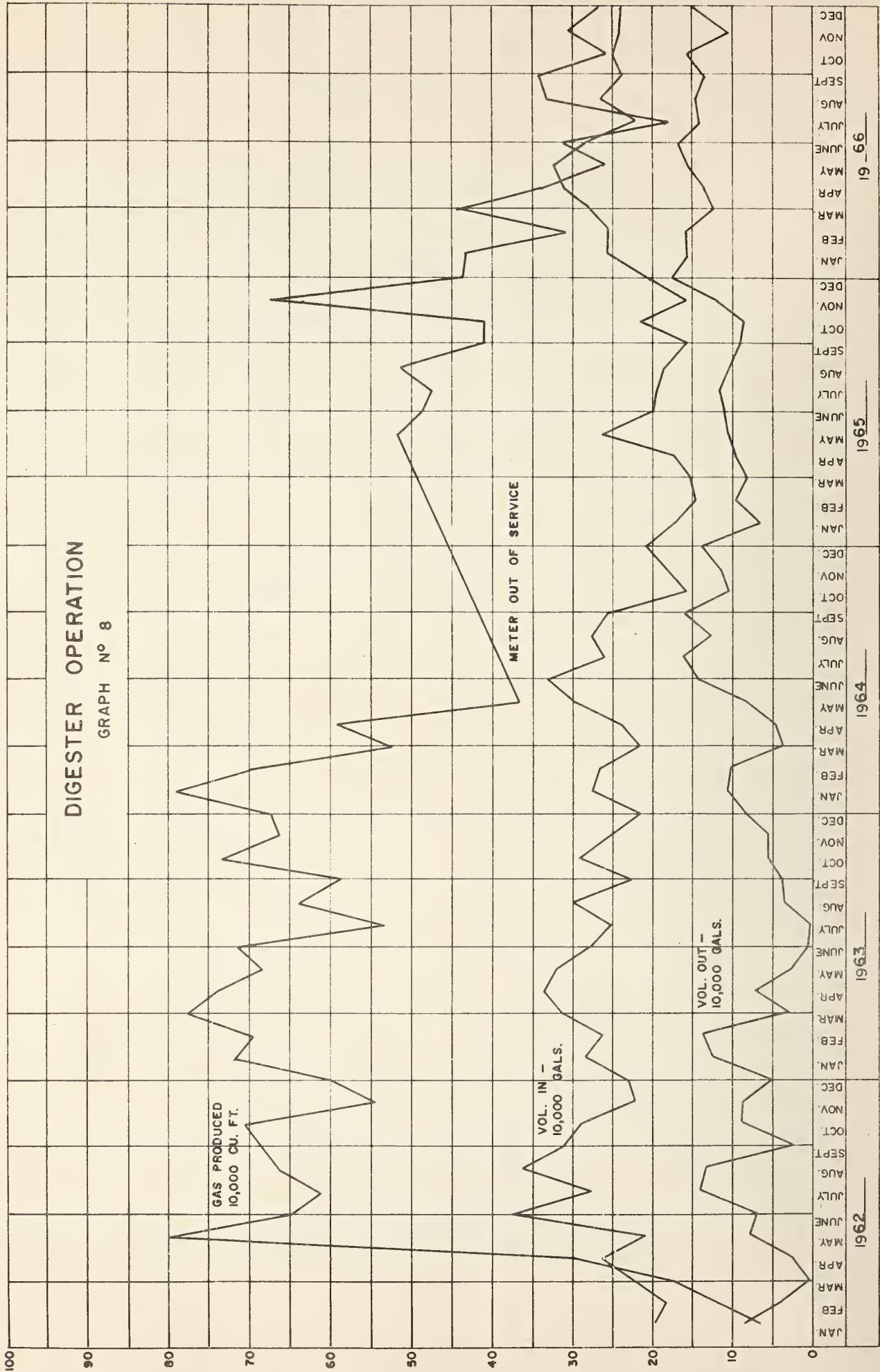
### COMMENTS

Average aeration section parameters averaged on a per month basis are plotted on the accompanying graphs.

The average pound of BOD per 100 pounds of MLSS of 14 is within the lower range of acceptable limits for good aeration section operation.

The average cubic feet of air supplied per pound of BOD removed was higher than the normal accepted figure of 1000. Coarse type air diffusers in the latter part of the aeration section are mainly responsible for the higher than average oxygen consumption.

DIGESTER OPERATION  
GRAPH NO 8



## DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000's Cu. Ft.
	1000's CU. FT.	% SOLIDS	% VOL. MAT.	1000's CU. FT.	% SOLIDS	% VOL. MAT.	
JAN	40.63	4.66	2.88	24.84	3.60	1.80	432.94
FEB.	40.38	4.08	2.58	25.42	3.69	1.96	305.35
MAR.	44.18	4.20	2.60	19.87	4.48	2.31	474.00
APR.	49.84	3.81	2.44	22.04	4.45	2.44	339.20
MAY	51.71	3.77	2.38	25.15	3.70	2.06	255.61
JUNE	43.84	3.78	2.38	27.01	4.22	2.36	314.49
JULY	35.53	3.80	2.51	22.36	5.00	2.50	*u/s
AUG.	42.58	4.02	2.36	22.98	4.48	1.97	332.76
SEPT.	38.32	3.97	2.51	21.42	4.20	2.15	343.76
OCT.	40.20	3.67	2.29	24.84	4.57	2.36	259.60
NOV.	38.71	3.25	1.98	16.41	4.15	2.23	306.90
DEC.	38.43	3.15	1.94	22.67	3.80	2.03	270.60
TOTAL	504.35	-	-	275.01	-	-	** 3965.68
AVG	42.03	3.85	2.40	22.92	4.20	2.18	330.47

\* Meter out of service during July.

\*\* Total prorated on 11 months data.

### COMMENTS

Volumes of sludge pumped to and from the digester and gas produced are plotted on a monthly basis on the accompanying graph.

The volume of sludge pumped to the digesters is misleading when computing the volume reduction of sludge pumped to and from the digesters. Past experience has indicated that without returning a high volume of supernatant to the primary clarifiers, it is not possible to obtain a high solids content in either the primary sludge or in the digested sludge. Therefore, due to sludge recirculation, the volume of sludge pumped to the digesters is higher than normally expected.

The average percent reduction in volatile matter during the year was 33.5 percent.

## CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	51.134	1661	3.25
FEBRUARY	54.795	1670	3.05
MARCH	84.537	2014	2.38
APRIL	50.051	1546	3.09
MAY	47.319	1290	2.73
JUNE	44.576	1426	3.20
JULY	37.582	1192	3.17
AUGUST	37.619	1043	2.77
SEPTEMBER	44.295	1268	2.86
OCTOBER	41.942	1430	3.41
NOVEMBER	35.495	1196	3.37
DECEMBER	49.073	1357	2.76
TOTAL	578.418	17093	-
AVERAGE	48.202	1424	2.96

### COMMENTS

An average chlorine dosage rate of 2.96 ppm was necessary to maintain a residual of not less than 0.5 ppm.

## CONCLUSIONS

The average BOD and suspended solids removals were 94.0 percent and 97.0 percent respectively which indicates that the plant afforded excellent efficiency in treating the sewage.

Throughout the plant for

Date Due

active and effi-

ONTARIO WATER RESOURCES COMMISSION DIVISION OF PLANT OPERATIONS.			
BURLINGTON (DRURY LANE) - WATER POLLUTION CONTROL PLANT, OPERATING SUMMARY 1966			
TD 227/B87/D78/W38/1966 MOE			
DATE	ISSUED TO C.1		

TD227/B87/D78/W38/1966/MOE  
Ontario Water Resources Co  
Burlington Drury  
Lane water pollution ashd  
c.1 a aa



Environment Ontario  
Ontario Ministry  
of Natural Resources  
Ontario Energy MNR  
Government of Ontario

TD  
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1966

Burlington Drury Lane : water  
pollution control plant.  
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